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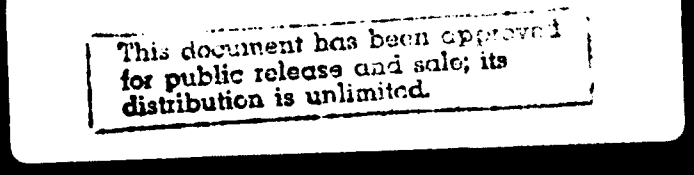
DETERRING REGIONAL THREATS FROM NUCLEAR PROLIFERATION

Leonard S. Spector



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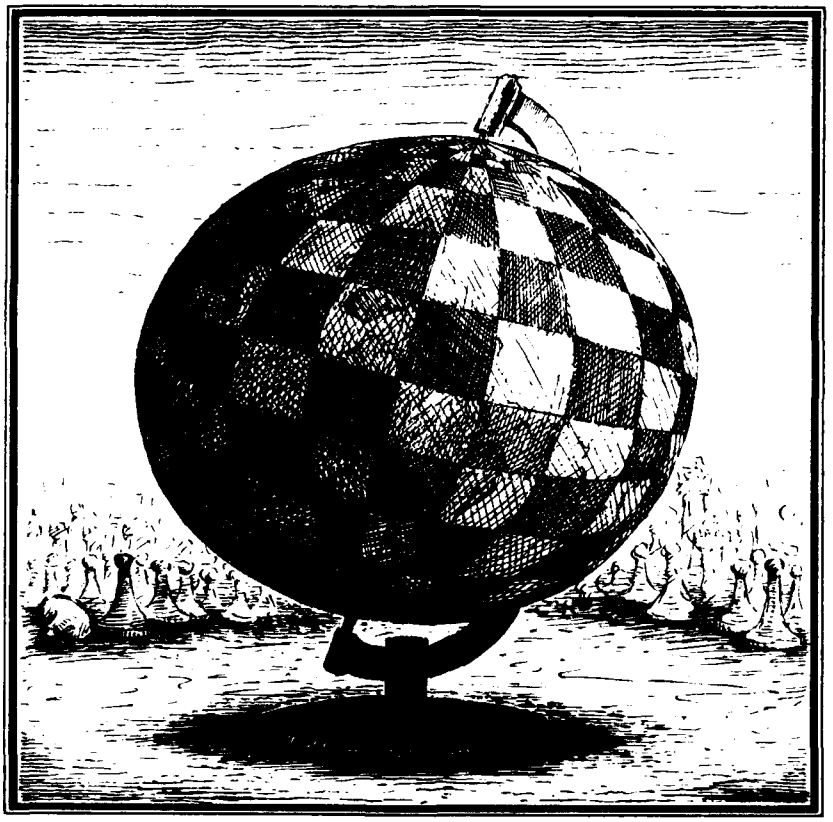

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FOREWORD

The most prominent shift in the National Military Strategy is from the global Soviet threat to a new focus on regional contingencies. No threat looms larger in these contingencies than the proliferation of nuclear weapons and ballistic missiles.

This study examines proliferation trends and proposes a predominately diplomatic strategy for containing the problem. Dr. Spector identifies three "waves" of proliferation: the first is the five states with declared weapons and doctrine–the United States, Russia, Great Britain, France, and China; the second includes a less visible group that developed a covert capability, without testing weapons or declaring a doctrine of "deterrence"–for example, Israel, India, and probably Pakistan; and, a third wave of would-be proliferators includes "radical states" like Iraq, Iran, Libya, and North Korea. Spector's political approach is based on the common interests of "wave" one and two states to prevent further proliferation. Political-economic incentives have already worked in the cases of Brazil, Argentina, Taiwan, and South Africa–states which appear to have abandoned their nuclear weapons programs.

Spector does not rule out the option of military force. Force, especially under international sanctions, can be a powerful tool to back diplomatic efforts. Use of force, however, remains a last resort.

The Strategic Studies Institute is pleased to publish Dr. Spector's report as a contribution to the strategic debate.

KARL W. ROBINSON
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BIOGRAPHICAL SKETCH OF THE AUTHOR

LEONARD S. SPECTOR has been active in the nuclear nonproliferation field for over 10 years, working first at the Nuclear Regulatory Commission and later as Chief Counsel to the Senate Energy and Nuclear Proliferation Subcommittee. While with the Subcommittee, Mr. Spector assisted in drafting the 1978 Nuclear Nonproliferation Act, the basic law governing U.S. policy today. Since 1984 he has been a Senior Associate at the Carnegie Endowment for International Peace and Director of its Nuclear Nonproliferation Project. He is the author of the Endowment's five annuals on the spread of nuclear weapons, *Nuclear Proliferation Today*, *The New Nuclear Nations*, *Going Nuclear*, *The Undeclared Bomb*, and (with Jacqueline R. Smith) *Nuclear Ambitions*.

DETERRING REGIONAL THREATS FROM NUCLEAR PROLIFERATION

Introduction.

The 1991 Gulf War and the more recent disintegration of the Soviet Union strongly suggest that the most serious challenges to U.S. security in the coming decade are likely to be posed by hostile regional powers. Such powers will be able to threaten American interests abroad, as well as American forces deployed overseas, and, in some cases, even the continental United States. *The success of such regional actors in challenging American power will depend in large part on their ability to threaten the United States or its allies with injury so severe in comparison to the U.S. interests at risk that American decisionmakers shrink from employing economic or military coercion to achieve national foreign policy objectives.* A regional adversary's possession of even a small number of nuclear weapons could be sufficient to deter the United States.

If this analysis is correct, then protecting U.S. interests in the future may ultimately depend in large measure on preventing the spread of nuclear arms. Curbing the build-up of potent nonnuclear forces by hostile regional states may be a necessary corollary of this axiom, however, since such capabilities, if targeted against U.S. friends in the region, can also provide a deterrent umbrella under which would-be nuclear-weapon states can pursue their ambitions. Uncertainties as to whether regional nuclear adversaries can be deterred from using nuclear arms and questions as to whether defenses can be developed against such weapons, if deterrence fails, make preventive steps all the more imperative. The use of military force to block the spread of nuclear-weapon capabilities to potential new adversaries will rarely be an attractive alternative; but diplomatic efforts, if pursued aggressively and backed with the threat of military force in appropriate cases, may be able to achieve this goal.

Recalibrating U.S. Risks and Benefits.

Implicit in this problem is the premise that, with the end of the cold war, a new risk/benefit calculus will infuse American strategy. During the cold war, the fear of domination by a militant superpower espousing an abhorrent political ideology gave rise to a credible U.S. deterrent posture based on a willingness to risk annihilation in the defense of the American way of life. Even during this period, however, questions were raised about the viability of U.S. nuclear deterrence when extended to the protection of Europe and other allies. Widespread doubts about the willingness of the United States to risk its own nuclear destruction in the defense of its NATO partners led to the deployment of U.S. intermediate-range nuclear missiles in Europe in the mid-1980s, whose purpose was to convince friend and foe alike that the United States was, indeed, prepared for strategic nuclear war in defense of its European allies.

As we look to the next decade, the risks for the United States arising from new regional challenges, though important, are likely to be far less than those that were at issue in the cold war. U.S. economic interests and those of friendly industrialized states may be endangered. The principles of democracy, human rights, and international law may be jeopardized. Regional allies less closely tied to the United States than Europe, Japan, or South Korea may be imperiled. Iraq's invasion of Kuwait in August 1990 embodied all of these challenges and led to war, but future confrontations may implicate only some of these U.S. interests. Threats to the very existence of the United States and its principal allies–i.e., threats comparable to that posed by the Soviet Union during the cold war–appear increasingly implausible.

With the stakes thus likely to be reduced in comparison to those of recent decades, how much will the United States be prepared to risk in pursuit of lesser national objectives? Again, the case of the Gulf War is instructive. During the latter half of 1990, the United States was deeply divided on the question of using force to oust Iraq from Kuwait, despite the multiple U.S. interests at issue, and, in January 1991, the Congress

endorsed military action by only the narrowest of margins. At the time, it was well understood that Saddam Hussein lacked the ability to attack the United States directly–although there were fears that he might launch a wave of terrorism against American targets. The greatest concern was that war might result in thousands of U.S. military casualties, some caused by Iraq's expected use of chemical weapons. Even this moderate threat was nearly sufficient to deter American intervention.

The victory of the United States and its allies over Iraq, with its astonishingly low casualty rate, proved that, at least in some regional settings, America can use force without suffering a heavy toll in human lives. This may well increase the readiness of the public to support military action the next time an American president seeks a mandate to employ it. At the same time, however, by creating the sense that victory can be had with little human cost, the experience of the Gulf War has also undoubtedly reinforced American aversion to conflicts where greater sacrifices may be demanded.

As the Gulf War began, the upper boundary of the potential threat that Iraq posed to the United States and to most U.S. allies in the region was directly related to the status of Iraq's programs to develop weapons of mass destruction and advanced delivery systems. The war implicitly established a ranking of the threat posed by weapons in these categories. Neither the United States, Israel, or any other member of the U.S.-led coalition perceived Iraq's chemical weapons, for example, as having the ability to inflict damage so grave as to deter military intervention. The most important reason for this was undoubtedly that military and civilian defensive measures appeared sufficient to address chemical attacks, had they come. Moreover, it was thought that threats of massive conventional retaliation, hints of a U.S. or Israeli nuclear response, and the implicit U.S. threat to expand the aims of the war to include the occupation of Iraq and the toppling of Saddam Hussein provided a deterrent against Iraq's use of these arms.[1]

Before the war, Iraq was also thought to possess the ability to deploy biological weapons (both infectious agents and

toxins)–a capability confirmed by post-war UN inspections. Again, however, this potential was insufficient to deter the United States and its coalition partners from military action. Defensive measures, in particular the inoculation of military personnel, and the implicit threats of escalation noted above again provided confidence that the coalition could withstand Iraq's use of this capability and offered the hope that Saddam Hussein would be dissuaded from employing it.

Iraq's well-known ballistic missile capabilities, similarly, did not pose a sufficiently serious threat to keep the coalition from going to war. The expectation that preventive air strikes against Iraqi missile launchers would quickly eliminate this capability and the deployment of anti-missile defenses reduced concerns over this component of the Iraqi arsenal, although, in practice, blunting this threat proved more difficult than anticipated.

Importantly, it was also widely understood before the war that Iraq did *not* possess the ability to manufacture nuclear weapons, although there were concerns that it might be able to fabricate one or two nuclear devices by mid-1991, by diverting a quantity of weapons-grade uranium fuel supplied during the 1980s by France and the Soviet Union. The basic assessment that Iraq was not nuclear-capable was correct; post-war inspections have revealed, however, that Iraq was pursuing a massive, clandestine nuclear weapons program, akin to the Manhattan Project, that would have given it the ability to produce a number of nuclear bombs by the mid-1990s.

If, prior to the war, Iraq had possessed even one or two nuclear devices, however, and if the whereabouts of these weapons had not been known, the possibility that they might have been smuggled into Israel, Saudi Arabia, Western Europe, or the United States would have greatly affected the risk/benefit calculations in Washington and other coalition-state capitals of going to war. Unlike the case with chemical and weapons and ballistic missiles, no defenses would have been available to the coalition against Iraqi nuclear blackmail, and with the strong U.S. interest in upholding the taboo against using nuclear arms and its commitment to

avoiding civilian casualties, there is some question as to whether Saddam Hussein would have perceived the threat of U.S. nuclear retaliation as credible. Given the close divisions that were seen in the United States over the use of force even in the absence of such a nuclear threat and the availability of a widely supported alternative course of action–namely, waiting to see whether economic sanctions would be sufficient to oust Iraq from Kuwait–it is highly likely that had Iraq possessed nuclear arms, U.S military intervention would have been delayed, if not abandoned altogether.

In the Gulf War, substantial, though not paramount U.S. interests were thus at issue, while the military threat that Iraq posed to the United States was only moderate. Accordingly, the potential benefits of going to war outweighed the disincentives against doing so. In future regional confrontations the magnitude of American interests at stake is unlikely to be any greater but the military threat posed by the regional adversary could be far more dangerous than that posed by Iraq if that adversary possesses even a handful of nuclear arms.[2] In this context, the risks to the United States of intervention could easily outweigh the potential benefits, and coercive U.S. action could well be deterred, even by such a minimal nuclear force.

The Current Regional Nuclear Powers and the Non-Proliferation Regime.

Nuclear arms have spread slowly. The United States acquired its first nuclear weapons in 1945, the Soviet Union in 1949, Great Britain in 1952, France in 1960, and China in 1964. Since the arrival of these five declared nuclear-weapon states, only four additional nations that have sought to manufacture nuclear arms have acquired the ability to do so: Israel in 1968-1969, India in 1970-1971, South Africa in 1980-1981, and Pakistan in 1986. (A summary of the nuclear status of these and other regional states is provided at Appendix A.)

As the uncertainty surrounding these dates suggests, proliferation in the latter four states has followed a pattern that is significantly different from proliferation involving the five

major powers. Each of the five unambiguously demonstrated its arrival as a nuclear-weapon state with an announced nuclear weapon detonation. The states that subsequently crossed the nuclear-weapon threshold, however, have kept their nuclear status ambiguous, while denying that they were building nuclear arms.[3] Moreover, except for a single nuclear detonation by India in 1974, none of the four *de facto* nuclear states is known to have conducted any nuclear weapon tests,[4] although there has been widespread speculation that a signal observed in September 1979 by a U.S. monitoring satellite flying over the South Atlantic was that of an Israeli nuclear test, conducted with the aid of South African facilities.[5]

Despite the lack of tests, however, few observers doubt that emerging nuclear states can develop reliable, early generation fission weapons–i.e., "atomic" bombs that use the principles of the Hiroshima and Nagasaki devices–by using information available in the unclassified literature, along with computer simulations and assiduous testing of the non-nuclear components of such arms. Three of the four "threshold" states, moreover, are thought to have obtained nuclear weapon design information from more advanced nuclear powers: Israel from France and possibly, by illicit means, the United States; South Africa from Israel; and Pakistan from China.

Since the most difficult and time-consuming step in developing nuclear weapons is producing the fissile material for the core of such weapons–either highly enriched uranium (used for the core of the Hiroshima bomb) or plutonium (used for the core of the Nagasaki bomb)–the arrival of Israel, India, South Africa, and Pakistan as *de facto* nuclear powers is usually dated from the point at which they acquired the ability to produce such materials. This effort, which requires the construction and operation of a chain of complex facilities, has taken each of these countries at least 10 years to achieve.

In broad terms, the reluctance of the four to become declared nuclear powers or to broadcast their capabilities through extensive nuclear testing programs has stemmed from the judgment that ambiguity was an optimal strategy. Because considerable information about their respective nuclear activities leaked out over the years, these countries enjoyed

most of the deterrent benefits of an overt nuclear posture but avoided the international opprobrium that such a posture would have incurred. In addition, ambiguity was less likely to stimulate neighboring states to develop countervailing nuclear capabilities.

Lack of nuclear testing is generally thought to have prevented emerging nuclear states from graduating to full-fledged thermonuclear "hydrogen" bombs and the enhanced radiation variant of such advanced weapons, the "neutron bomb."[6] Nonetheless, the *de facto* nuclear powers have not limited themselves to simple atomic weapons deliverable from aircraft. Data provided to the London *Sunday Times* in 1986 by former Israeli nuclear technician Mordechai Vanunu indicates that Israel has developed "boosted" nuclear weapons–i.e., fission weapons that use the principle of thermonuclear fusion to enhance their efficiency.[7] This means it probably has weapons that are several times more powerful than the Nagasaki device. India and Pakistan are known to be developing the technology needed for such armaments. Similarly, Israel is believed to have deployed 400-mile-range, nuclear-armed ballistic missiles and, apparently in collaboration with South Africa, is developing systems with substantially greater reach. India will soon deploy a 150-mile range, nuclear-capable missile and is developing an intermediate range system able to travel 1,500 miles. Pakistan also has a nuclear-capable surface-to-surface missile under development and has sought to purchase a 180-mile range system from China.

As the programs of the four *de facto* nuclear weapon states evolved, international efforts spearheaded by the United States and actively supported by the Soviet Union led to the creation of the nuclear nonproliferation regime, a series of interlocking treaties, inspection arrangements, and other international undertakings that have considerably constrained the spread of nuclear arms and helped to establish a global norm against their acquisition. At the heart of the regime are the International Atomic Energy Agency (IAEA) and the Nuclear Nonproliferation Treaty (NPT).

The IAEA is a Vienna-based multilateral organization with over 100 member countries that was established in 1957 to promote the peaceful uses of nuclear energy and to apply a system of accounting controls and on-site inspections, known collectively as "safeguards," to verify that nuclear materials and facilities voluntarily submitted for such monitoring were not used for the development of nuclear arms. The NPT came into force in 1970. Under the treaty, "nonnuclear-weapon state" parties–i.e., parties that had not detonated a nuclear explosion prior to January 1, 1967–formally pledge not to manufacture nuclear explosives of any kind and agree to accept IAEA safeguards on all of their nuclear activities (except for those that might relate to nuclear submarine propulsion), an arrangement known as "full-scope safeguards." The weapon-state parties are exempted from these restrictions, but are prohibited from transferring nuclear explosives to nonnuclear-weapon states and from assisting them to manufacture such devices; weapon-state parties also pledge to make good faith efforts to end the nuclear arms race and to work toward global disarmament. All countries accepting the treaty agree not to export nuclear equipment or material to nonnuclear-weapon states except under IAEA safeguards, a condition that has become the basis for a robust system of national and multilateral export control programs implemented by the industrialized, nuclear supplier countries.

The United States, Great Britain, and the Soviet Union were original nuclear-weapon-state parties to the treaty. In 1991, France and China, the two remaining nuclear-weapon states, agreed to join the pact and are expected to formalize their adherence in 1992, a step that will reinforce the normative value of the accord. More than 145 nonnuclear-weapon states have also joined the treaty, making it the most widely accepted arms control treaty today. Iraq's extensive violations of the accord, discussed below, have raised questions as to its effectiveness, however, particularly with respect to Libya, Iran, and North Korea–nonnuclear-weapon-state parties whose commitment to the treaty has been questioned because of their apparent interest in acquiring nuclear arms. Israel, India, Pakistan, and, until 1991, South Africa all remained outside the treaty, operating nuclear facilities not subject to IAEA

safeguards that provided the highly enriched uranium or plutonium needed for nuclear arms.

Active and sustained U.S. diplomatic efforts have been a third major pillar of the nonproliferation regime. American initiative has been instrumental not only in the creation of the IAEA and the NPT, but also in addressing proliferation threats posed by specific countries. U.S. pressure is widely credited, for example, with dissuading South Korea and Taiwan from pursuing nascent nuclear weapon programs in the mid-1970s, and more recently has been central to efforts to constrain North Korea's bid for nuclear arms.

The norms established by the nonproliferation regime and the threat of U.S. and international pressure have been instrumental in discouraging the four *de facto* regional nuclear powers from adopting overt, open-ended nuclear-weapon programs. At the same time, the ambiguous postures of these states has been far less damaging to the nonproliferation regime than the emergence of new declared nuclear-weapon states would have been and has sustained the dichotomy in the Nonproliferation Treaty that legitimates only five nuclear powers.

Most important, ambiguity has helped keep alive the possibility that a *de facto* nuclear-weapon state might some day formally and convincingly renounce nuclear arms. Indeed, in a dramatic shift of position, South Africa took this step in July 1991 by adhering to the NPT. As of early 1992, the International Atomic Energy Agency was in the process of applying safeguards to all nuclear materials in that country and to the facility processing them. A key first step is establishing an initial inventory of nuclear materials, including the weapon-grade materials that South Africa presumably produced during the 1980s. The treaty permits nonnuclear-weapon-state parties to possess weapons-grade nuclear materials under safeguards as part of peaceful nuclear programs. South Africa will probably be encouraged to dilute its weapons-grade uranium, however, to rule out the possibility that it might abrogate or withdraw from the NPT[8] at some future time and rapidly manufacture nuclear arms.

South Africa's abandonment of its undeclared nuclear-weapons program resulted from a series of circumstances that are not likely to be duplicated in the case of other regional nuclear powers for many years. Most important, the regional security threat that gave rise to the program, namely Soviet and Cuban involvement in southern Africa, evaporated with the end of the cold war, leading to a settlement in Angola and the independence of Namibia. In contrast, Israel's fears of its Arab neighbors, India's fears of China, and Pakistan's fears of India are likely to be enduring features of the international scene.[9]

Currently the United States is attempting to promote a process of confidence-building and negotiation in these various settings, aimed at resolving underlying disputes and reducing the risks of nuclear confrontation. In the Middle East, the centerpiece of the U.S. effort is furthering the Arab-Israeli peace process through direct talks among the parties. It is extremely unlikely, however, that Israel would consider any restrictions on its nuclear activities until there has been significant progress towards a regional peace settlement. Even then, Israel will undoubtedly want to retain its nuclear capability as an insurance policy against the possible resurgence of Arab militancy.

The Bush Administration has proposed a freeze on the reduction of weapons-grade nuclear materials in the region as part of a comprehensive Middle East arms control package, that would also include regional bans on chemical and biological weapons. Since Israel is the only Middle Eastern state that produces weapons-grade nuclear material today, the proposal, in effect, seeks to cap Israel's *de facto* nuclear arsenal, but does not contemplate Israel's renunciation of its existing nuclear armory. Even this partial step, however, is unlikely to be attractive to Israel, which perceives it as a first step towards nuclear disarmament, and the Arab states are equally likely to reject the proposal as one-sided, since it allows Israel to keep its most potent weapons, while requiring the Arab states to renounce theirs.

In South Asia, the Bush Administration is encouraging the expansion of confidence-building measures between Pakistan

and India, which now include an agreement for advance notification of military exercises, a hot-line between the militaries of the two countries, understandings about accidental cross-border military overflights, and an agreement by each state not to attack the nuclear installations of the other. Washington is also seeking to launch five-way talks on nuclear restraints involving India, Pakistan, United States, Russia, and China.[10]

In addition, since the late 1970s, Washington has sought to keep Pakistan from crossing the nuclear-weapon threshold by conditioning military and economic assistance on Pakistan's acceptance of a variety of nonproliferation controls. Washington waived a number of these restrictions during the 1980s to bolster Islamabad after the Soviet occupation of Afghanistan, but in 1985 Congress enacted a provision known as the "Pressler Amendment," specifying that aid to Pakistan could be provided only after the president certified during that fiscal year in which the aid would be given that Pakistan did not "possess a nuclear explosive device."[11] Presidents Reagan and Bush were able to make this certification for each fiscal year through the fall of 1989, even though Pakistan's nuclear advances continued. During the spring of 1990, however, when a crisis with India over Kashmir threatened to lead to hostilities, Pakistan apparently for the first time manufactured all of the components needed for nuclear weapons, and in the fall of 1990, at the beginning of fiscal 1991, President Bush declined to make the certification that the country did not possess a nuclear device, leading to the termination of American assistance.[12]

In early February 1992, Pakistan, in an apparent effort to obtain the restoration of U.S. assistance by accepting a new set of nonproliferation restrictions, departed from the traditional stance of the emerging nuclear powers and declared that it had, indeed, built the components for one or more nuclear weapons. It then pledged that it would not assemble any nuclear devices, conduct any nuclear tests, or transfer any weapons-related nuclear technology to others, and it announced that it had "permanently" frozen its nuclear-weapons program.[13] The Pakistani declaration–

openly confirming the purport of President Bush's failure since 1990 to certify that the country did not possess a nuclear device–led to immediate calls by hawkish Hindu elements in India for that state to declare itself a nuclear power.[14]

Whether New Delhi will resist such demands, as it has in the past, remains to be seen. If it does not, or if Islamabad becomes even more outspoken about its nuclear status, an important, if intangible, restraint on nuclear proliferation could be undermined.

The Next Wave: The Hostile Proliferators.

Historically Israel, India, South Africa, and Pakistan have either been friends of the United States, or at least not its enemies. Until recently, therefore, the principal danger posed to the United States by the emergence of these countries as *de facto* nuclear-weapon states was that their use or threatened use of nuclear arms in a regional conflict might have triggered a U.S.-Soviet nuclear confrontation with unpredictable consequences. With the end of the cold war and the disintegration of the USSR, however, this danger has largely passed. Accordingly, concerns over proliferation in Israel, India, and Pakistan–the remaining undeclared nuclear states of interest, now that South Africa has joined the NPT–currently are focused on the potential impacts of their future behavior on global nonproliferation objectives, such as preserving the 46-year-old taboo against the use of nuclear arms, reducing incentives for new states to develop such weapons, and limiting transfers of weapons-relevant nuclear technology.

Far more disturbing for U.S. policymakers than the activities of today's *de facto* nuclear powers, therefore, are the efforts of a second group of states to attain this status. This group includes Iraq, North Korea, Iran, Libya, and, to a lesser degree, Algeria. The first four of these states, led by radical leaders opposed to the international status quo, have been profoundly hostile to the United States and/or its regional allies for many years, and, as suggested earlier, their acquisition of even a small number of nuclear arms could have a grave

impact on American security, making prevention of this outcome an urgent priority.

The country-by-country summaries in Appendix A describe the status of the nuclear programs in each of these states and indicate that all are a number of years away from acquiring nuclear arms, with North Korea being the closest to attaining this goal. The key element that is lacking in every instance is access to weapons-grade nuclear material.

A variety of military and diplomatic options are potentially available for slowing the progress of these states towards the nuclear-weapon threshold. The Gulf War has lent a certain legitimacy to the former. Indeed, twice during 1991, South Korea's Defense Minister Lee Jong Koo raised the possibility that his government might consider military action to destroy key nuclear installations in North Korea.[15] Nonetheless, such steps are rarely likely to be an attractive alternative, even assuming that the circumstances provide a legal basis and a modicum of international backing for the effort, and even assuming that the action involves acceptable risks to the personnel involved in the action.

First, in most instances, states that are seeking to develop nuclear arms already possess significant conventional military power that would allow them to strike back if their nuclear installations were attacked. Iraq was unable to respond during the Gulf War or in 1981, when Israel destroyed the Osiraq reactor outside Baghdad, but this is more likely to prove the exception than the rule.

In the event of an American and/or South Korean attack against key North Korean facilities at Yong Byon, for example, the North could easily retaliate by targeting Seoul with Scud missiles, which the North is thought to possess in far greater numbers than Iraq did in 1991. The North might also attempt to damage South Korean nuclear power plants either with such missiles, through air strikes, or by sabotage (which it might also use to cripple key nonnuclear elements of the South's economic infrastructure). The risk of attacks by North Korean ground forces and the possible escalation to general war must also be recognized.

Similarly, if the United States attacked suspected clandestine nuclear facilities in Iran, the latter could easily retaliate against American allies in the Persian Gulf, including Saudi Arabia and the Arab emirates. Libya, if its nuclear sites were attacked, might attempt to retaliate against Egypt or NATO forces in the Mediterranean.[16]

In such instances, the conventional military power of the target country can thus provide a deterrent umbrella under which it can pursue its nuclear weapons program. To be sure, it might be possible for the United States or its regional partners to deter retaliation through the threat of further escalation, but the effectiveness of such measures would be unpredictable, and the very possibility of escalation could in some cases tip the risk/benefit balance against undertaking the attack in the first instance. This suggests an added reason for seeking to constrain the conventional as well as the nuclear military capabilities of potential nuclear states.

A second factor making military force less appealing as a means for checking the nuclear advances of the next wave of would-be nuclear-weapon powers is that it may simply be unable to achieve the desired objective. Prior to the Gulf War, Iraq had dispersed its nuclear activities widely and had disguised the facilities that housed them. As a result, a repeat of Israel's single-site bombing attack would have done little to arrest the Iraqi nuclear program, and even the extensive U.S. and coalition bombing raids during the conflict failed to destroy certain key Iraqi nuclear installations. Moreover, during the war, Iraq was able to move nuclear materials and essential equipment out of harm's way before some installations that had housed them were destroyed. Thus, even if the coalition's intelligence had been perfect, its bombing campaign would have been only partially effective in halting Iraq's nuclear advances.

A third shadow on the use of military force against nuclear installations is the danger of radiological consequences. Significant radioactive releases are most likely from attacks on nuclear reactors. Uranium processing and enrichment plants and plutonium extraction facilities contain much smaller inventories of volatile radioactive elements. The U.S. bombing

raids against Iraqi nuclear targets were the first in history to attack operating nuclear reactors, but the two units at the Tuwaitha Nuclear Complex outside Baghdad, with power levels of five megawatts and less than one megawatt, were quite small, and any radioactive releases would probably have been confined to the complex itself. In fact, the United States was able to avoid any releases by employing bombing tactics that caused the facilities to collapse inwardly, and that did not damage fuel contained in the facilities' water-filled reactor vessels.[17] An attack against North Korea's 30-megawatt reactor in Yong Byon, however, would be highly likely to have substantial off-site radiological consequences, exposing the attacking state to accusations that it had engaged in unconventional warfare and to substantial international criticism.

Despite these limitations, military force cannot be dropped from the list of options for preventing the advent of nuclear armed radical states. Indeed, the *threat of force* can be a useful tool to back diplomatic efforts to enforce nonproliferation controls and was invoked on a number of occasions during the summer and fall of 1991 to pressure Saddam Hussein to comply with the special UN-IAEA inspection regime implemented under Security Council Resolution 687.

Diplomatic initiatives to constrain the spread of nuclear arms, including the implementation of the nuclear nonproliferation regime, have had a number of important successes, as suggested above, arresting the nuclear weapons efforts of South Korea and Taiwan, for example, and leading South Africa to give up its status as a *de facto* nuclear-weapons state.[18] It must be recognized, however, that the circumstances surrounding each of these episodes were unique and that, in less favorable situations, the efforts of the United States and other interested parties were insufficient to dissuade Israel, India, and Pakistan from developing their respective nuclear capabilities.

One of the key elements underpinning diplomatic efforts to retard the spread of nuclear arms is the NPT, which, with its full-scope IAEA safeguards and considerable normative value, can have a significant impact on target states. Iraq, Iran, Libya,

and North Korea are parties, and in December 1991, just prior to the electoral crisis that led to the ouster of Algerian President Chedli Benjedid, his government indicated that Algeria might be prepared to join the pact. Supplier state export controls can also significantly retard nuclear programs in developing countries, where indigenous technological and industrial capabilities are limited.

The case of North Korea provides a current example of the potential effectiveness of nonproliferation diplomacy. North Korea signed the NPT in December 1985. For the next 6 years, however, it refused to sign an agreement with IAEA to place all of its nuclear materials (except uranium ore and natural uranium concentrate) and the facilities that process them under IAEA inspection. Although the North's obligation to sign and implement a full-scope safeguards agreement is absolute, in the late 1980s, it began insisting upon a nuclear quid pro quo from the United States as a condition for signing the accord. Most often, it demanded the removal of U.S. nuclear weapons from South Korea.

Over the past 2 years, as U.S. concerns have increased, the Bush Administration gradually intensified its efforts to slow the North Korean nuclear program, raising the issue persistently at the IAEA, at the 1990 NPT Review Conference, and similar fora; pressing North Korea in bilateral discussions to sign its agreement with the IAEA; successfully encouraging Japan to condition recognition of the DPRK and the provision of financial aid to the North on the latter's taking this step; coordinating closely with South Korea; and seeking the support of the Soviet Union and China in restraining Pyongyang.

The collapse of the Soviet Union and President Bush's September 27, 1991, decision to withdraw all U.S. tactical ground- and sea- launched nuclear weapons from deployment around the world broke the impasse. By the end of December, South Korean President Roh Tae Woo had announced that all nuclear arms had been withdrawn from his country (including air-launched systems thought to have been deployed there); North and South Korea had signed an historic nonaggression pact; and the two countries had signed a comprehensive

nuclear accord, establishing a nuclear-weapon-free zone on the Korean Peninsula, providing for bilateral nuclear inspections, and prohibiting either state from operating facilities, such as the one North Korea has been building, capable of producing weapons-grade nuclear materials. Finally, on January 29, 1992, the North signed its safeguards agreement with the IAEA.

As of this writing, questions remain as to whether the North's actions have been sincere and whether it will, in fact, implement its bilateral and IAEA inspection agreements. Nonetheless, the record of diplomatic accomplishments has been impressive. If the inspection agreements are implemented and both North and South refrain from building the most sensitive nuclear plants, the threat of nuclear proliferation in Northeast Asia would ease considerably.

Much will depend, however, on the effectiveness of IAEA inspections under the NPT–inspections which failed to constrain Iraq, raising serious questions about the adequacy of the treaty and the IAEA system. Under the NPT, Iraq was required to declare all of its nuclear installations and materials (except uranium ore and ore concentrate) and submit them to IAEA inspection to allow verification that they were not being used for the development of nuclear weapons. Iraq repeatedly violated this obligation, operating a number of undeclared facilities for processing raw uranium into feedstock for the uranium enrichment process and enriching the material on a trial basis. Moreover, even at the five-megawatt reactor and nearby laboratories at Tuwaitha, which were under IAEA monitoring, Iraq was able to circumvent the agency's controls and covertly produce a small quantity of plutonium.

Historically, the IAEA has relied on the inspected state to declare all of its nuclear activities voluntarily and has then limited its inspections to the declared material and facilities. Although IAEA agreements with NPT parties authorize the agency to undertake "special inspections" of suspected undeclared nuclear sites with the consent of the inspected country, the agency has never attempted to exercise this authority. In the wake of its failures in Iraq, however, the agency's secretariat has declared that it will begin to employ

this special inspection authority, and, at its December 1991 meeting, the agency's board of governors quietly gave its approval to this intensification of the organization's safeguards system.

A first test of the fortified inspection system could come in Iran. U.S. officials have been quoted as stating that the country is engaged in a secret nuclear weapons development program. Although the location of weapons-related activities remains uncertain, several sites are under suspicion, including one northwest of Tehran and another near Qazvin.[19] For obvious reasons, Iran has not declared any of these sites to the IAEA. If facilities at any of these locations are producing or using nuclear materials, or if they are being built to do so, Iran is violating its IAEA obligations by not allowing agency inspectors to scrutinize the installations. It remains to be seen whether, in the months ahead, the agency will demand special inspections at any of these locations. The availability of special inspections could also play an important role in North Korea, providing an additional element of confidence in the web of verification that is being established on the Peninsula.[20]

In addition, the nuclear accord between North and South Korea embodies an important restraint that has been seen in a number of other settings recently and is emerging as an important adjunct to the traditional elements of the nonproliferation regime; restrictions on the acquisition of weapons-grade nuclear materials. Even before it joined the NPT, for example, South Africa closed the facility thought to be its sole source of weapons-grade enriched uranium, an important confidence-building measure that effectively capped its nuclear weapons potential. As noted earlier, the Bush Middle East arms control plan also calls for a freeze on the production of weapons-grade nuclear materials and in parallel with their 1991 agreement for comprehensive mutual nuclear inspections under IAEA oversight, both Argentina and Brazil have pledged to limit the output of their uranium enrichment plants to nonweapons-grade material. In these instances, diplomatic initiatives and agreements are having an important impact on restraining the spread of nuclear arms.

Nuclear export controls, finally, though far from being completely effective, were able to slow the pace of Iraqi nuclear advances somewhat and are currently being strengthened in a number of respects. Nuclear-supplier-country control lists are being expanded to include dual-use items; China, by joining the NPT, is accepting binding legal commitments to require IAEA safeguards on all of its nuclear exports–a policy it has voluntarily embraced in the past but implemented only intermittently; and efforts are under way to reduce the threat of leakage from the former Soviet Union of nuclear weapons or related expertise, technology, materials, or equipment.

This last issue, the impact on nuclear proliferation of the disintegration of the Soviet Union, is beyond the scope of this study. It poses an enormous challenge, however; if a flood of nuclear material cascades from the republics of the Commonwealth of Independent States, it could all too easily overwhelm the treaties, inspections, and other elements of the nonproliferation regime.

Conclusions.

Today, the spread of nuclear arms to new states poses one of the most serious risks to U.S. security, in part because even a small number of nuclear weapons may be sufficient to deter forceful U.S. diplomatic or military intervention in instances where only its regional interests, rather than national survival, are at issue. The fact that the next states that are likely to acquire nuclear arms are under radical leaders who are openly hostile to American interests provides particular cause for concern.

Because of the risk of retaliation by target countries against U.S. allies, questions of efficacy, and the danger of radiological releases, the use of military force to prevent further proliferation will rarely be an attractive alternative, even if the legal grounds for such action could be established in particular cases and a measure of international support for such measures obtained. Although the option of using military force to halt nuclear proliferation should be retained, usually as a last resort, diplomatic initiatives are clearly preferable and have

proven effective in a number of instances, when aggressively pursued. Recent efforts to strengthen key elements of the nonproliferation regime should enhance the efficacy of this approach.

ENDNOTES

1. Whether Iraq was deterred by these threats from using chemical weapons in the war or simply lacked the logistical and technical capabilities to employ them in the Kuwaiti theater remained uncertain after the conflict, but a growing body of evidence supported the latter hypothesis. In addition, Iraq apparently had not mastered the technology for mounting chemical warheads on its ballistic missiles; although such warheads were found by UN inspectors after the war, they reportedly caused the missiles to behave erratically and were not deemed usable.

2. It is possible that biological weapons may some day also achieve this deterrent effect, if the prospect of their effective use against cities appears credible. This threshold was not reached in the Gulf War.

3. For decades, India, Pakistan, and South Africa consistently maintained that their nuclear programs were entirely peaceful, while Israel has long employed the ambiguous formula that it will not be the country to "introduce" nuclear weapons into the Middle East. Even in the months prior to the 1991 Gulf War, when Israel faced the possible threat of chemically armed Iraqi missiles, Israeli leaders only hinted at the country's nuclear potential, declaring that Israel would respond "a hundred times harder" if attacked with chemical weapons, without saying more. A recent change in Pakistan's declared policy is discussed later in the text.

4. Even India attempted to disguise its intentions by calling its test a "peaceful nuclear explosion" of the type the United States and the Soviet Union were exploring at the time. India has not conducted further tests or deployed nuclear arms, although it has invested heavily in building the infrastructure to do so.

5. In a recent book on the Israeli nuclear program, investigative journalist Seymour Hersh stated that, in fact, Israel conducted three tests in September 1979, but only one was observed by the U.S. satellite. See Seymour M. Hersh, *The Samson Option*, New York: Random House, 1991, p. 271.

6. In *The Samson Option*, Hersh states that Israel, in fact, possesses neutron bombs in considerable numbers. Hersh rests his conclusions on interviews with various U.S. and Israeli sources but does not provide any technical details. If Hersh is correct that Israel conducted three nuclear tests

in 1979, however, this might have provided Israel enough data to confirm the reliability of a neutron bomb design.

7. "Revealed: The Secrets of Israel's Nuclear Arsenal," *Sunday Times* (London), October 5, 1986.

8. Under Article X of the NPT, parties are permitted to withdraw from the pact on 90 days' notice if their "supreme interests related to the subject matter of this treaty" are jeopardized.

9. For many years it was also feared that Argentina and Brazil might emerge as *de facto* nuclear-weapon powers, particularly during the period when the two states were under military governments. Neither country reached the point of producing weapons-grade nuclear material and, as the two came under civilian control in the mid-1980s, they began a process of economic integration and confidence-building that led to a series historic reciprocal visits to key nuclear installations. In 1991, the two began to implement a program of comprehensive bilateral nuclear inspections to be overseen by the International Atomic Energy Agency. Although both states continue to reject the NPT as discriminatory, the bilateral inspections are comparable to the full-scope IAEA safeguards required by that accord. Neither state has faced a significant external threat for many years, contributing to their readiness to renounce nuclear arms and accept comprehensive monitoring arrangements.

10. This initiative was first proposed by Pakistan. Pakistan for years has offered to enter into comprehensive bilateral nonproliferation agreements with India, but India has rejected these proposals arguing that it cannot give up its nuclear weapons option as long as it faces a nuclear threat from China. Since Pakistan has been aware of India's stance, there has been some question as to whether Pakistan's offers have been sincere or more diplomatic gambits. The Pakistani proposal for five-way nuclear talks sought to address India's concerns about China by including Beijing in the discussions.

11. Foreign Assistance Act of 1961, section 620E (e).

12. India, which has received little in U.S. economic and military aid over the years, but which purchased a pair of U.S. nuclear power reactors in 1963, has been to subject to somewhat different sanctions. Washington terminated all nuclear cooperation with respect to the facilities in 1982 because of India's refusal to place all of its nuclear installations under IAEA safeguards, including those that produce materials for India's *de facto* nuclear weapons program.

13. R. Jeffrey Smith, "Pakistan Official Affirms Capacity for Nuclear Device," *The Washington Post*, February 7, 1992; Paul Lewis, "Pakistan Tells of Its A-Bomb Capacity," *The New York Times*, February 8, 1992.

14. Steve Coll, "India Pressured on Bomb," *The Washington Post,* February 9, 1992.

15. David E. Sanger, "U.S. Officials Step Up Warnings to North Korea on Nuclear Arms," *The New York Times*, November 21, 1991.

16. On April 15, 1986, in retaliation for a U.S. air strike on several targets in Libya the previous day, Libya launched an attack with Scud-B missiles against the U.S. Coast Guard base on the Italian island of Lampedusa. The missile (or missiles) fell into the sea several hundred yards short of the U.S. base, however.

17. The U.S. attacks were only the most recent of substantial number of previous backs on nuclear plants by a variety of states. During World War II, for example, Allied warplanes attacked heavy water production sites in Norway. In September 1980, Iran unsuccessfully attacked Iraq's Osiraq reactor, also at the Tuwaitha site. The facility was subsequently destroyed by an Israeli air strike in June 1981. Between March 1984 and July 1988, Iraqi warplanes struck Iran's nuclear power reactor construction site at Bushehr seven times, causing heavy damage and, according to Tehran radio, killing a total of thirteen individuals. The final Iraqi attack, on July 19, 1988, came one day after Iran had accepted a United Nations-sponsored ceasefire in the Iran-Iraq War.

18. See also the discussion of Argentina and Brazil in note 9.

19. Charles Aldinger, "Iran Not Close to Developing Nuclear Arms," Associated Press, October 31, 1991; "The China-Iran Nuclear Cloud," *Mednews*, July 22, 1991 (giving the precise location of Iran's nuclear weapons research center as Moallem Kalayeh, in the Elburz Mountains, just north of Qazvin).

20. To be successful, the special inspection system–and, indeed, the entire nonproliferation regime and the diverse diplomatic efforts complementing it–must be backstopped by effective intelligence. The revelations about Iraq's clandestine nuclear activities have raised serious questions about the adequacy of nuclear intelligence-gathering by the United States and other concerned nations, inasmuch as these efforts failed to identify the portion of Iraq's nuclear program that had advanced the farthest: its attempt to enrich uranium to weapons-grade using electromagnetic devices, known as "calutrons." The calutron program came to light only as the result of the post-war UN-IAEA inspection regime established under Security Council Resolution 687–and even then, the inspectors did not learn about the calutrons until an Iraqi electrical engineer who had worked on the program defected to U.S. forces. With the end of the cold war, the United States is substantially increasing the intelligence resources devoted to proliferation questions.

APPENDIX A

EMERGING NUCLEAR WEAPONS NATIONS

De Facto Nuclear-Weapon States.

ISRAEL

- Probably has 75-100 undeclared N-weapons; possibly 300.
- Thought to have obtained first N-weapons in late 1960s.
- Beginning in 1982 apparently built "boosted" weapons that rely on H-bomb principles; may possess "neutron bombs" (low-blast, high radiation H-bombs).
- Thought to have deployed 400-mile-range nuclear capable missiles; testing intermediate-range missile (800 mi.? 2,000 mi.?) since 1987.
- May have conducted N-test in South Atlantic in 1979 (possibly three tests).
- Not party to Nuclear Nonproliferation Treaty (NPT).

INDIA

- Has essentials for 75-100 A-bombs that could be deployed quickly.
- Conducted single nuclear test in 1974; no further N-tests.
- Has greatly expanded N-weapons production capability in recent years; reportedly designing H-bomb.
- Tested N-capable short-range missile five times since 1989; tested intermediate-range missile (1,500 mi.) in 1989.
- Not party to NPT; unwilling to join even if Pakistan does because of Chinese N-threat.

PAKISTAN

- In February 1992, Foreign Secretary declared Pakistan possessed components for the cores of at least one N-weapon but that Pakistan had "permanently frozen" its production of such components and of weapons-grade nuclear material.
- Probably has material, and possibly all components, for 15-20 undeclared A-bombs that could be deployed quickly.
- Apparently obtained material for first atomic weapon in 1986.
- U.S. aid cut off in 1990 when President Bush declined to certify that Pakistan did "not possess a nuclear explosive device," a condition for aid to Pakistan under U.S. law.
- No N-tests, but believed to have received N-weapon design from China.
- Attempting to develop "boosted" N-weapons.
- Tested N-capable short-range missile in 1989; received similar system from PRC in 1991.
- Not party to NPT, but has stated it is willing to join if India does.

Abandoning De Facto Nuclear-Weapons Program (by Joining NPT).

S. AFRICA

- Assumed to have essentials for 15-25 N-weapons.
- Able to build N-weapons since 1980-81.
- May have assisted, and received data from, suspected Israeli N-test in 1979.
- Joined NPT in July 1991.
- International Atomic Energy Agency (IAEA) conducting initial inventory in order to safeguard all existing N-materials and ensure that none are used for weapons.
- Possibly in collaboration with Israel, developing intermediate-range (800 mi.? 2,000 mi.?) missile, suggesting some continuing interest in N-weapons.

Actively Seeking Nuclear Weapons.

N. KOREA

- Has built sizeable research reactor and is building plutonium plant that could soon allow N-weapons production; second larger reactor under construction.
- Party to NPT (1985) but above plants not under IAEA inspections since country had refused to sign safeguards agreement with IAEA required by NPT.
- December 1991 withdrawal of U.S. N-weapons from South Korea, long demanded by North, paved way for late December North-South Korea agreement for N-weapon free zone, including bilateral inspections and mutual pledge not to build plants capable of producing weapons-grade nuclear materials. Discussions on substance of N-S bilateral inspections postponed to early 1992.
- Signed IAEA safeguards agreement in January 1992, but IAEA inspections to be applied only after NK ratifies IAEA agreement.

IRAN

- A number of years away from possibly building N-weapons indigenously.
- Reactivating weapons program with some help from China and others; clandestinely seeking N-technology in Western Europe.
- No major N-weapon facilities apparently under construction, as yet, but research believed to be taking place at clandestine facilities.
- Party to NPT.

IRAQ

- Post Gulf War inspections revealed previously unknown multi-track program to enrich uranium to weapons grade; partially completed facilities might have permitted production of weapons-grade material for first device by 1993; most facilities/ equipment destroyed during or after 1991 Gulf War.

- 7th UN-IAEA inspection in fall 1991 noted presence of weapons-grade uranium, indicating Iraq was either able to produce the material or secretly acquired it from outside source; quantity available to Iraq not known; IAEA verifying accuracy of its measurements; material could allow rapid Iraqi manufacture of N-weapon.
- Earlier Iraqi N-weapons effort thwarted in 1981, when Israel destroyed Osiraq reactor.
- Party to NPT; found by IAEA in mid-1991 to have violated treaty by producing undeclared nuclear materials at undeclared facilities.

LIBYA

- A number of years away from possibly building N-weapons indigenously.
- No major N-weapon facilities apparently under construction, as yet.
- Attempted to purchase atomic bomb in early 1970s and in 1981.
- Party to NPT.

Possibly Interested In Nuclear Weapons.

ALGERIA

- Currently lacks the facilities to produce material for N-weapons.
- In 1986, secretly began construction, with Chinese assistance, of research reactor with potential to produce weapons material; placing unit under IAEA safeguards as result of U.S. pressure, after reactor's discovery of reactor in early 1991.
- Army and "High State Committee" seized power in mid-December 1991 and ousted President Chedli Benjedid when it appeared that imminent elections would bring Muslim fundamentalists to power.
- Not party to NPT, but prior to Benjedid's ouster, government indicated readiness to join treaty.

Abandoned Nuclear Weapons Programs During Past 10 Years.

BRAZIL

- Launched N-weapons program in 1979; halted by current civilian government.
- Has built facilities necessary for N-weapons capability as part of nuclear energy and research program, but has not produced N-weapons material.
- Concluded agreement with Argentina in 1991 to implement comprehensive bilateral inspections under IAEA auspices; signed three-way agreement with IAEA and Argentina in December 1991 formalizing arrangement, despite military's objections.
- Not party to the NPT (but has accepted NPT-style inspections, as noted above).
- Some work on short-range N-capable missiles; building space launch vehicle with long-range missile potential.

ARGENTINA

- Has built facilities necessary for N-weapons capability as part of nuclear energy program, but has not produced N-weapons material.
- Civilian government opposed to nuclear arming.
- Concluded agreement with Brazil in 1991 to implement comprehensive bilateral inspections under IAEA auspices; signed three-way agreement with IAEA and Brazil in December 1991 formalizing arrangement.
- Not party to NPT (but has accepted NPT-style inspections, as above).
- In 1980s, cooperated with Egypt and Iraq on N-capable, short-range Condor II missile; program halted in 1991.

TAIWAN

- Has sizeable nuclear power program, but lacks facilities to produce material for N-weapons.
- Built secret lab to extract plutonium in 1987, but dismantled unit under U.S. pressure before plutonium obtained. (Made similar